

Transforming the Providence I-95 Northbound Viaduct



*Bringing a critical interstate segment up to a state of good repair
and improving the flow of freight throughout Rhode Island and
The Northeast Megaregion*



Basic Project Information:

What is the Project Name?**Transforming The Providence I-95 Northbound Viaduct**

Who is the Project Sponsor?**RIDOT**

Was an INFRA application for this project submitted previously?**YES**

If Yes, please include title ***"The Providence I-95 Northbound Viaduct: Driving a State of Good Repair and Improving Safety and Efficiency for the Northeast Megaregion"***

Project Costs:

INFRA Request Amount**\$75 Million**

Estimated federal funding (excl. INFRA)**\$125 Million**

Estimated non-federal funding**\$50 Million**

Future Eligible Project Cost (Sum of previous three rows)**\$250 Million**

Previously incurred project costs (if applicable)**\$5.6 Million**

Total Project Cost (Sum of 'previous incurred' and 'future eligible')**\$256.6 Million**

Are matching funds restricted to a specific project component? If so, which one?**NO**

Project Eligibility:

Approximately how much of the estimated future eligible project costs will be spent on components of the project currently located on National Highway Freight Network (NHFN)?**\$250 Million**

Approximately how much of the estimated future eligible project costs will be spent on components of the project currently located on the National Highway System (NHS)?**\$250 Million**

Approximately how much of the estimated future eligible project costs will be spent on components constituting railway-highway grade crossing or grade separation projects?**\$12 Million**

Approximately how much of the estimated future eligible project costs will be spent on components constituting intermodal or freight rail projects, or freight projects within the boundaries of a public or private freight rail, water (including ports), or intermodal facility?**\$250 Million**

Project Location:

State(s) in which project is locatedRHODE ISLAND

Small or large projectLARGE

Urbanized Area in which project is located, if applicableProvidence, RI-MA

Population of Urbanized Area1,190,956 (2018)

Is the project currently programmed in the

TIP?YES

STIP?YES

MPO Long Range Transportation Plan?YES

State Long Range Transportation Plan?YES

State Freight Plan?YES



March 4, 2019

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Dear INFRA Review Team:

We stand on the cusp of a once-in-a-lifetime opportunity to alleviate the current ills plaguing the third-most traveled segment of interstate in all of New England, the section of Interstate 95 Northbound known as the Providence Viaduct. This important gateway on the I-95 corridor is dangerous, crumbling, and its design flaws create congestion issues for miles around. There is precious little time left to repair it. That is why Rhode Island Department of Transportation (RIDOT) is requesting **\$75 Million (30%) from the U.S. Department of Transportation's Infrastructure for Rebuilding America ("INFRA") Grant Program to support Transforming the Providence I-95 Northbound Viaduct, a \$250 Million project that will dramatically improve the most important stretch of interstate in Rhode Island.**

The Viaduct was originally constructed in the 1960s to carry I-95 through the heart of Providence. Today it serves as a vital link for people and commerce across the Northeast megaregion, a powerhouse of density and economic output, producing 20 percent of the nation's GDP with 17 percent of the population on 2 percent of the nation's land area.

Simply replacing the Viaduct in-kind would lock in the existing congestion and safety issues for another 100 years. **We cannot allow that to happen.** Instead, the project we are proposing with this INFRA Grant application will include integral access facility improvements that will serve to remedy critical deficiencies in the existing freeway network.

The project proposed here will complete RIDOT's years-long effort to bring this critical segment of I-95 up to a state of good repair with an improved design. **Transforming the Providence I-95 Northbound Viaduct** will include a full reconstruction of the main Viaduct (Bridge No. 578) with a 100-year service life, along with:

- Construction of a new collector-distributor (C-D) road along the right side of the new Viaduct Structure to effectively eliminate the weaving conflicts and congestion that presently afflict the segment of I-95 Northbound from the 6/10 Connector (and Downtown) on-ramp at Exit 22 to the State Route 146 / Orms Street / State Offices off-ramp at Exit 23;
- Reconfiguration of ramp facilities that will effectively disentangle currently conflicting movements, improving motorist safety and comfort, reducing congestion and delay, and providing new, efficient connections between the arterial freeway facilities of I-95, the 6-10 Connector, and State Route 146; and
- Restoration of the underside of the Viaduct, which will revitalize a critical East-West connection in the heart of Downtown Providence.

Completion of this project will improve safety, traffic flows, and freight movement through Rhode Island, and add to the overall economic vitality of Downtown Providence and our region.

As the Northeast Megaregion grows, so do the demands on I-95, causing key intersections like this one to become chokepoints and safety risks. The 55-year-old Viaduct was designed to

handle a daily volume of 57,000 vehicles, but now carries over 220,000. The Viaduct has long been identified as requiring full replacement due to its poor structural condition, a function of its age and the traffic loads it has carried over its lifespan, which have far exceeded those for which it was originally designed.

Bridges within this project are in a poor state of repair, either structurally deficient or functionally obsolete. One bridge is fracture critical, necessitating frequent and costly patchwork repairs just to keep it and the surrounding stretch of I-95 functional. The current configuration of the Viaduct also compromises safety and efficiency. More than 1,000 vehicle crashes have occurred in this area over a recent five-year-period, the results of tight merges and weaves that become even more treacherous as congestion worsens.

While the importance of the safety and efficiency of this intersection is outsized relative to the dimensions of Rhode Island – the smallest state – so are the costs of improving it to meet the scope of the demands that it faces. Rhode Island's State Transportation Improvement Plan (STIP) only accounts for an in-kind replacement, which would bring it to a state of good repair but preserve inefficiencies and operational safety risks.

From a budgetary standpoint, the magnitude of the project is immense; fixing the Viaduct's many problems will cost significantly more than simply replacing it in-kind. The total cost of the project proposed in this application rivals an entire year of the state formula allocation. **But with INFRA support, RIDOT will deliver this project on-time, and on-budget.**

RIDOT is focused on integrating best practices for permitting and project delivery. While this project had been complicated for years by tangled implementation of Section 106, RIDOT leadership has worked out a solution with FHWA that created a new, executable Section 106 Programmatic Agreement that will bring this project into compliance, thereby allowing us to move forward effectively and efficiently.

RIDOT is excited about the opportunity to complete this innovative and essential project, and we thank you in advance for your careful consideration of our request for INFRA support.

Sincerely,



Peter Alviti, Jr., PE,

Director

Rhode Island Department of Transportation

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I. Project Description

Project Summary

The most critical piece of highway infrastructure in Rhode Island, the Providence I-95 Northbound Viaduct, is in critical condition. A vital freight connector in the Northeast Corridor and the entire length of I-95 along the East Coast, Rhode Island Department of Transportation (RIDOT) continues to seek innovative solutions to replace this crumbling bridge-and-highway structure, requesting \$75 Million (30%) in Infrastructure for Rebuilding America (INFRA) Grant support for this vital \$250 Million project.

Originally constructed 55 years ago to carry I-95 through the heart of Providence, the Providence Viaduct (Bridge No. 578) spans the Woonasquatucket River, the Amtrak Northeast Corridor (NEC), city roads, and the interchange ramps of Exit 22, which provide access between I-95 Northbound and the major U.S. Route 6 / State Route 10 east-west expressway (the “6/10 Connector”). The Viaduct is currently a structurally deficient safety risk in desperate need of full replacement to ensure the stability and vitality of I-95 in New England. One bridge in the Viaduct is fracture critical, several more are structurally deficient, and the underside of the structure is lined with timber to prevent pieces of the deteriorating deck from falling onto cars and pedestrians below.

Figure 1—An Aerial View of the Providence Viaduct



Now the **third most-traveled segment of I-95 in the Northeast Corridor**, the Providence Viaduct has also been forced to operate well beyond the bounds of its anticipated capacity for decades. Completed in 1964, the Viaduct carries more than 220,000 vehicles every day, nearly four times the 57,000 daily vehicles it was designed to carry.

As the Federal Highway Administration (FHWA) will no longer authorize funding for the continued rehabilitation of this infrastructure, RIDOT is seeking to expedite construction of the replacement Viaduct Northbound structure (as part of the Providence Viaduct Northbound Project). Once this project is completed, this critical segment of the interstate will finally be fully restored to state of good repair.

This project will also improve the interweaving system of ramps that feed into the Viaduct, eliminating a major bottleneck **and vastly improving the efficiency with which people and goods move throughout Rhode Island’s capital region**. Improving traffic flows and public safety in this corridor will generate considerable benefits to the state and local economy. By reducing congestion around the capital – Rhode Island’s economic powerhouse, Providence becomes a more desirable place to work and do business.

Simply replacing the Viaduct in-kind would lock in the existing congestion and safety issues for another 100 years. **That cannot be allowed to happen.** As envisioned, the Providence Viaduct Northbound Project will include integral access facility improvements that will serve to remedy critical deficiencies in the existing freeway network:

1. **The reconstruction of the Northbound Viaduct** with a 100-year service life, completing RIDOT's years-long effort to bring this critical segment of I-95 up to a state of good repair;
2. **The construction of a new collector-distributor (C-D) road** along the right side of the new Viaduct Structure **will effectively eliminate the weaving conflicts and congestion** that presently afflict the segment of I-95 Northbound from the 6/10 Connector (and Downtown) on-ramp at Exit 22 to the State Route 146 / Orms Street / State Offices off-ramp at Exit 23;
3. **The reconfiguration of ramp facilities** which will effectively disentangle currently conflicting movements, improving motorist safety and comfort, reducing congestion and delay, and providing new, efficient connections between the arterial freeway facilities of I-95, the 6-10 Connector, and State Route 146; and
4. **The restoration of the underside of the Viaduct**, which will revitalize a critical East-West connection in the heart of Providence.

Ultimately, this project will reduce congestion, improve travel times, minimize the frequency and severity of vehicle collisions throughout and the system, and **reduce queueing from the Route 6/10 East approach by up to 84 percent during peak hours.** The Providence Northbound Viaduct Project also support key INFRA program objectives by aligning with the merit criteria for construction projects. This project will:

1. **Support economic vitality at national and regional level** by restoring the third-most travelled segment of I-95 along the Northeast Corridor to a state of good repair, thereby ensuring the effective and efficient flow of freight throughout the state, region, and country;
2. **Leverage federal funding to attract non-Federal sources of infrastructure investment** by committing \$50M in state funds to reconstruct and improve the design of the most-traveled highway asset in Rhode Island to provide a foundation for the future site of RhodeWorks Toll Gantry Location 5,¹ which will generate an estimated \$2 Million in annual state revenue to support the maintenance of the Viaduct and other state-funded infrastructure investment;
3. **Deploy innovative technology** like Dedicated Short Range Communications (DSRC) Systems and CAV-friendly striping and signage to allow integration with intelligent driving systems, **encourage innovative approaches to project delivery** by deploying accelerated construction methods through a design-build procurement process, and **incentivize the use of innovative financing** by utilizing direct GARVEE bonds and leveraging the proposed INFRA grant to free up funding to invest in Rhode Island's crumbling roads and bridges; and
4. **Ensure that RIDOT stays accountable for its performance** by reporting the progress of construction in the Department's Quarterly Report, monitoring time travel savings data following the completion of the project, and establishing a detailed maintenance plan with dedicate resources to support the preservation of the new Viaduct.

¹ The completion of this project is a prerequisite for the construction of RhodeWorks Truck-Only Toll Gantry Location 5, which will be built on the Viaduct.

This segment of I-95 through Providence's urban core includes major freeway interchanges with Interstate 195 (I-195), Routes 6 and 10, and Route 146 within a span of less than two miles, providing critical linkages between origins and destinations throughout the state and New England. **The completion of the Providence Viaduct Northbound Project will ensure that these major arteries continue to serve the needs of residents, commuters, and commerce in the 21st century and beyond, and will significantly increase efficiency in the movement of people and goods throughout the transportation system.**

A Structurally Deficient Viaduct is a Threat to the Primary Highway Freight System

Due to its age and overutilization, the Viaduct has long been identified as requiring full replacement, and it continues to be RIDOT's top priority. Multiple bridges within this project are structurally deficient, and one bridge is fracture critical, necessitating frequent and costly patchwork repairs just to keep it and the surrounding stretch of I-95 functional.

Since the early 2000s, extensive spalling throughout the underside of the concrete deck structure has necessitated the use of timber shielding to prevent concrete debris from falling on facilities beneath the Viaduct, including roads, sidewalks, and the rail corridor. Steel reinforcement is exposed in numerous locations, compromising the strength of the decking to support traffic loads and exacerbating its deterioration. The concrete piers which comprise the existing Viaduct substructure also exhibit clear signs of deterioration and loss of strength.

Several of the post-tension anchorage pockets at the end and underside of "hammerhead" pier caps are in poor condition, with most of the end anchors exposed and rusted. Testing has revealed the strength of concrete in the majority of piers to be less than original design values, and many piers have chloride contamination that exceeds acceptable levels.

In addition to the Viaduct itself, the condition of interchange ramp and overpass bridges along the interstate corridor are in a similarly poor state of repair. Of the four bridges that are to be replaced under the project (including the existing Viaduct)

Figure 2 --Typical Underside of Deck and Framing, Shielded with Timber, Looking North



Figure 3 --Spalling, Underside of Deck



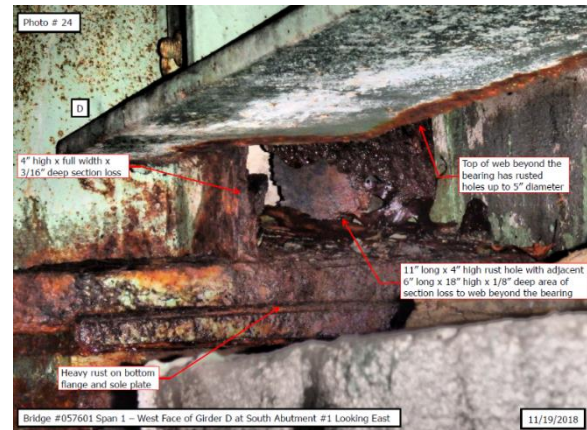
Figure 4 -- Rusted End Anchor



three are classified as structurally deficient (including the “fracture critical” Atwells Avenue on-ramp bridge).

The most recent National Bridge Inventory reports for the existing Viaduct (2017,2018) have identified numerous deficiencies in the structural elements supporting existing northbound facilities. Due to the severe condition of certain members (described and depicted below), RIDOT and FHWA have mandated that bi-monthly inspections be conducted as a condition of allowing the facility to remain open to traffic. These costly inspections – along with the several emergency repair contracts that have been commissioned over the past decade to remedy critical deficiencies where and when they are identified – are a drain on RIDOT’s fiscal resources, as monies that could be more productively spent elsewhere are being used to maintain a facility that has long been identified as requiring complete replacement.

Figure 5 --West Face of Girder D at South Abutment #1 (Span 1, Bridge No. 576)



9,257
Daily Trucks



6.15 Minutes
Average Peak Delay



\$2.53 Million
Annual Cost of Delay

In addition to the already significant routine maintenance and inspection costs, certain emergency repairs to the structure are required nearly every year to address critical issues with the potential to require partial or full closure of the facility, or worse, result in structural failure. To date, RIDOT has incurred significant (and unsustainable) costs in conducting emergency repairs on the existing Viaduct, measures that are necessary to ensure that the Interstate facility can safely remain open to traffic. Three such emergency repairs were made in 2009, followed by further emergency repairs to structural steel members in 2013. Over a 10-year period, the bridge maintenance repair costs and bi-monthly inspections have cost the State of Rhode Island an estimated \$5.4 million, **and RIDOT is spending another \$2.4M this year to repair selected piers.**

The complete replacement of the I-95 Northbound facility is urgently needed to ensure that this critical link of the Interstate System and national freight network is restored to a state of good repair. **Closing the Viaduct or posting weight limits on its bridges would result in incalculable complications for the Primary Highway Freight System.**

To protect the economic vitality of Rhode Island and the Northeast Megaregion, the Providence Viaduct Northbound must be replaced, and it must be improved. The existing design of the Viaduct creates congestion issues that translate to more than **\$2.5 million in wasted commercial vehicle operating costs every year**. The Viaduct cannot be allowed to fail, and it must not be replaced in-kind. Replacing the outdated design would be inefficient, irresponsible, and bad for business.

The congestion and safety issues posed by the subject interchanges confer significant impacts onto the local, state, and national freight networks these arterial freeways serve. In developing [Rhode Island's Statewide Freight and Goods Movement Plan](#), the Department of Administration and RIDOT have identified the State's two highest highway freight project needs to be:

1. Replacement of the I-95 Viaduct at U.S. Route 6; and
2. Improvements to the diverge on I-95 Northbound at Route 146

The proposed Providence Viaduct Northbound Project fully addresses these priority needs, **significantly improving the efficiency, safety, and reliability of the highway freight network.**

The Current Viaduct Design Compromises Safety and Efficiency

More than 1,000 vehicle crashes have occurred in this area over a recent five-year-period, the results of tight merges and weaves that become even more treacherous as congestion worsens. **The proposed project would virtually eliminate the design flaws creating these issues, thereby considerably improving public safety.** Without this project, RIDOT estimates that if the bottleneck is not addressed, by 2035, a typical 7-mile afternoon rush hour trip from Reservoir Avenue in Cranston R.I. to Branch Avenue in Providence will take 35 minutes. However, investing in the region today will ensure that **the same trip will take only 6 minutes in 2035, even accounting for anticipated increases in vehicle traffic.** [For users of that common route, this project will therefore save the average driver 176.4 Vehicle Hours Travelled \(VHT\) per year.](#)

Unquestionably, the most problematic and precarious section of I-95 Northbound through Rhode Island is the approximately ¼-mile segment between (a) the on-ramp from the 6-10 Connector Inbound and Downtown Providence (Memorial Boulevard) and (b) the Exit 23 off-ramp to State Route 146 and Orms Street. This "State Offices" exit has gained notoriety as one of the most severe bottlenecks in the regional highway network, due to the short distance over which vehicles must weave to complete certain interchange movements. Currently, vehicles destined for I-95 Northbound from 6/10 (and Downtown Providence) must weave left over this

*Figure 7 -- Current
Traffic Flow Statistics
(2018 Averages)*

220,000

**Average Daily
Northbound Traffic**
(Cars + Trucks)

28.60

**Average Northbound
Speed in Project Area**
(MPH)

2.23

**Typical Congestion
Index**

$\left(\frac{\text{Average Travel Time}}{\text{Free Flow Travel Time}} \right)$

short distance to gain access to I-95 through lanes, while vehicles approaching the Viaduct on I-95 destined for Route 146 (and the local Orms Street off-ramp) must weave right over this same distance.

In addition to the adverse highway safety conditions, the directly conflicting movements are the principal cause of chronic bottlenecks, with congestion rapidly propagating along approaching freeways as traffic volumes increase during peak hours. During such periods, peak hour back-ups along I-95 Northbound, the 6/10 Connector Inbound and I-195 Westbound often extend several miles.

These existing bottleneck segments also pose a significant safety hazard to motorists, due to the combined effects of high volumes of traffic, conflicting origin-destination movements, substandard lane widths, and other functional deficiencies. [The proposed action would eliminate more than 300 of the 1,000 vehicle crashes that occurred along these segments over a 4-year span from 2013-2017, including 3 of the 8 serious injuries.](#)

Figure 8 – Typical Bottleneck on the Providence Viaduct, I-95N Seen from Downtown Providence On-Ramp (Route 146 / State Offices Exit Visible in the Distance)



As [Section V](#) and [Section VII](#) describe in more detail, RIDOT estimates that this project will reduce collisions by up to **43 percent**, generating an initial safety benefit of **\$1.97M** per year.

This Project is the Solution to the Viaduct’s Congestion and Safety Issues

Since the last round of INFRA Grant proposals were submitted in November 2017, RIDOT has continued to work with its consultants and local partners to develop 10 percent designs for the Viaduct project. The resulting plans use a phased approach to replace the Viaduct with minimal impacts to existing traffic flows. **All timeline information throughout this narrative is based on a presumed notice-to-proceed (NTP) date of April 30, 2020.**

The Providence Viaduct Northbound Project will address the current deficiencies in the existing highway infrastructure by temporarily shifting northbound traffic to the vacant old Southbound structure to make room for construction on the old Northbound structure to proceed unimpeded. The improvements at the site will include innovative incorporation of a C-D road and access ramp modifications in the proposed Viaduct Northbound replacement design, which effectively eliminate conflicting weave movements and provide more accommodating, streamlined access between freeway facilities.

Once construction is complete, the movements from the 6/10 Connector to I-95 Northbound, the 6/10 Connector to Route 146 Northbound, and I-95 Northbound to Route 146 Northbound will no longer interfere with one another. As a result, this critical highway asset will not only be restored to a state of good repair, its new design will generate substantial operational benefits, including safety improvements and significant reductions in congestion and travel times.

The phases of this project are discussed in more detail in [Section VI. Project Readiness](#). The total future eligible costs associated with this project are estimated to be approximately \$250 Million. **The requested \$75 Million INFRA Grant would support 30 percent of that total cost. Without INFRA support, RIDOT cannot guarantee that the project can be completed as described here. However, with INFRA support, RIDOT will be able to complete this project and make additional investments in its other structurally deficient bridges.**

Figure 9 -- A Visual Rendering of the Proposed Structural Changes
(Note New C-D Road, Ramp Modifications, and I-95NB Replacement)

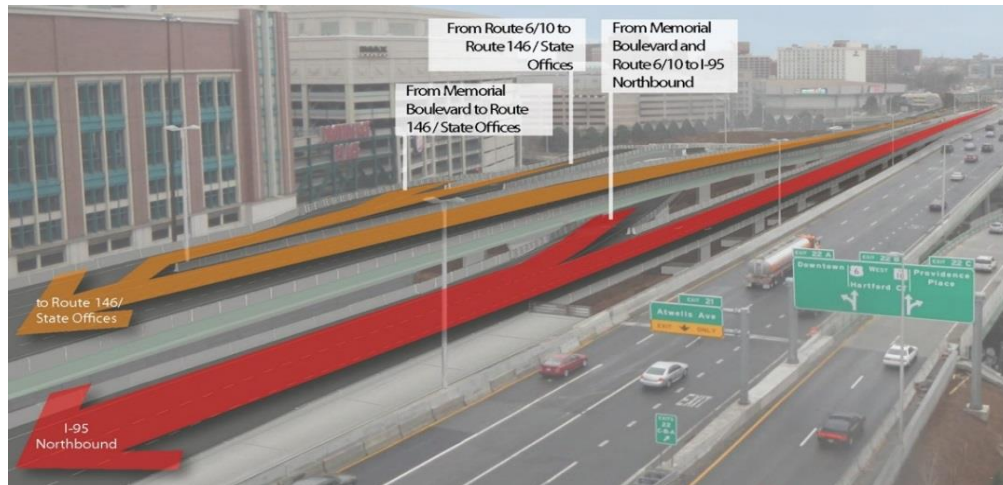
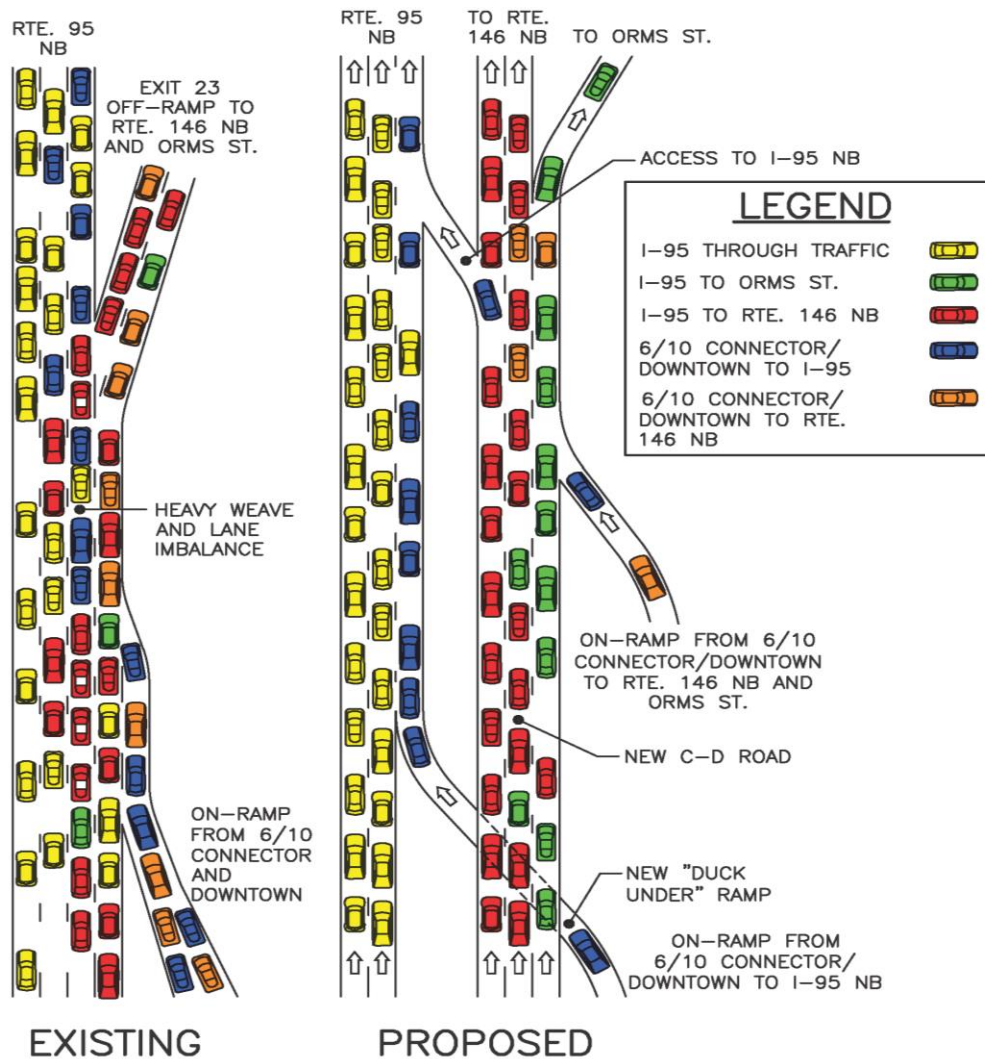


Figure 10 -- Schematic of Proposed Traffic Flow Improvements
(Note the Elimination of Conflicting Movements)



II. Project Location

The I-95 Providence Viaduct is located in Providence, Rhode Island (41.826° N, 71.419° W). The four-mile stretch of highway set to be addressed by this project is the epicenter of highway travel in Southern New England. The Northbound Viaduct carries the interstate facility over the Woonasquatucket River, and links I-95 with I-195, U.S. Route 6 and State Route 10 and State Route 146.² The Viaduct effectively connects I-95 to each of the next-most-traveled routes in Rhode Island, serving hundreds of thousands of vehicles combined on a daily basis. The Viaduct also serves as an important link to Amtrak and MBTA services at Providence Station, major freight activity in the nearby Ports of Providence and Davisville, and a wide breadth of commercial and residential developments in the nearby cities of Providence, Cranston, Pawtucket, Warwick, and East Providence.

Figure 11 -- Project Location Along I-95 Within the State of Rhode Island



State Routes 6 and 10

Extending west from the interchange with I-95, the 6/10 Connector continues southwest for approximately 1.4 miles to another major urban interchange, which provides access between U.S. Route 6 (east-west), State Route 10 (north-south), and the local roads in the Providence neighborhood of Olneyville.

From this interchange, Route 10 continues south, reconnecting with I-95 into neighboring Cranston and completing a beltway loop through Providence's densely inhabited Olneyville, Federal Hill, Silver Lake, and West End neighborhoods. U.S. Route 6 is the primary link between Providence and points west (including Hartford, Connecticut), extending from the 6/10 Interchange to Interstate Route 295 (I-295) along a 4-mile segment of limited access freeway before continuing west into Connecticut as an undivided four-lane highway.

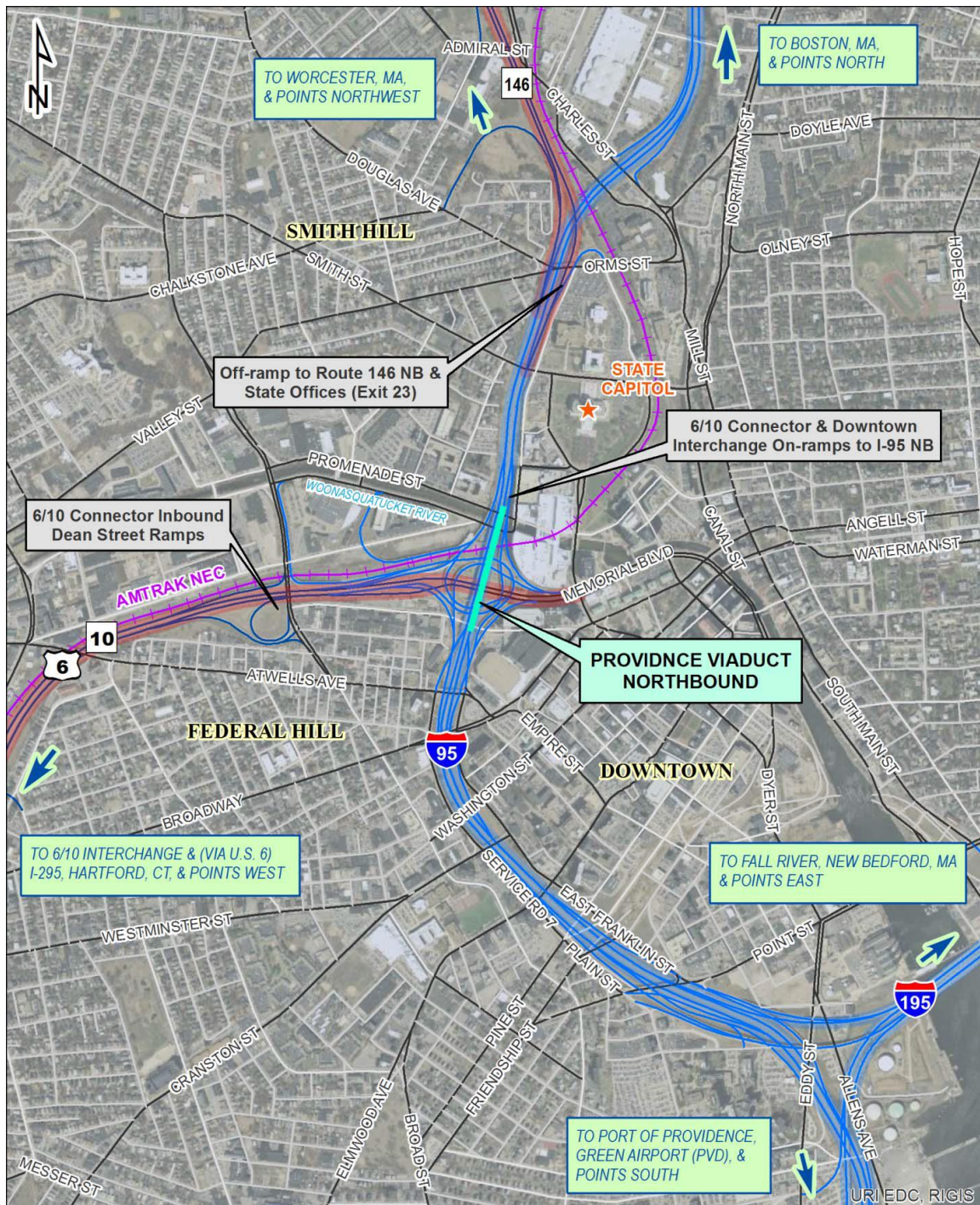
Amtrak and the Northeast Corridor (NEC)

The Amtrak Northeast Corridor (NEC) runs in a general north-south direction through Providence and is spanned by the Providence Viaduct where the railway crosses the Woonasquatucket River. As the nation's principal rail right-of-way along the Eastern Seaboard – extending from Richmond, Virginia, north to Boston, Massachusetts, and servicing New York, Philadelphia, and Washington, DC – this corridor is host to various freight, high-speed, and commuter rail services/uses. Locally, Providence Station (just northeast of the Route 6/10 and I-

² The 6/10 Connector is currently under construction, scheduled for completion in 2023.

95 interchange) provides access to intercity (Amtrak) and commuter (Massachusetts Bay Transportation Authority) services, with the MBTA Providence/Stoughton Line providing service to Boston and south to T.F. Green Airport (PVD), the latter via the newly constructed InterLink Station.

Figure 12 -- Project Location Within the City of Providence, RI



Local Freight Connections

The project is situated at the core of the Providence, RI--MA Census Urbanized Area, an expansive 545-square mile region of Southern New England that encompasses Greater Providence (including the Rhode Island cities of Pawtucket, North Providence, Cranston, Warwick, East Providence, Woonsocket and Newport) and extends into portions of southeastern Massachusetts to include the cities of Attleboro and Fall River. I-95, I-195, U.S. Route 6, and State Routes 10 and 146 are all designated by the FHWA as links within the National Highway System (NHS) of roadways serving this area, a network that includes the Interstate Highway System and other roads critical to the nation's economy, defense, and mobility.

I-95 is designated as a Primary Highway Freight System (PHFS) facility on the National Highway Freight Network, one of the principal surface transportation corridors for the movement of freight and goods along the Eastern Seaboard and between origins/destinations throughout the United States. Together with the above-noted NHS Routes, the Interstate System is also the backbone of state and regional freight networks, with I-95 providing highway connectivity with the Port of Providence and the Port of Davisville (Quonset Point, 14 miles south of Providence.)

Through a joint effort between RIDOT and the Rhode Island Statewide Planning Program (Department of Administration), and with input through an extensive stakeholder working group, the State of Rhode Island has completed its Statewide Freight & Goods Movement Plan ([Freight Forward RI](#)). State officials have conducted extensive research to date, having commissioned studies and compiled data from a variety of sources to assess present conditions and future trends in all modes of freight movement (air, rail, marine, and truck), including the intermodal connectivity thereof. Officials have identified the state's two highest highway freight project needs to be (1) Replacement of the I-95 Viaduct at U.S. Route 6, and (2) improvements to the diverge on I-95 Northbound at Route 146. Construction of the Providence Viaduct Northbound Project will effectively address both of these vital needs through a single effort.

Figure 13 -- Rhode Island Freight Network Map

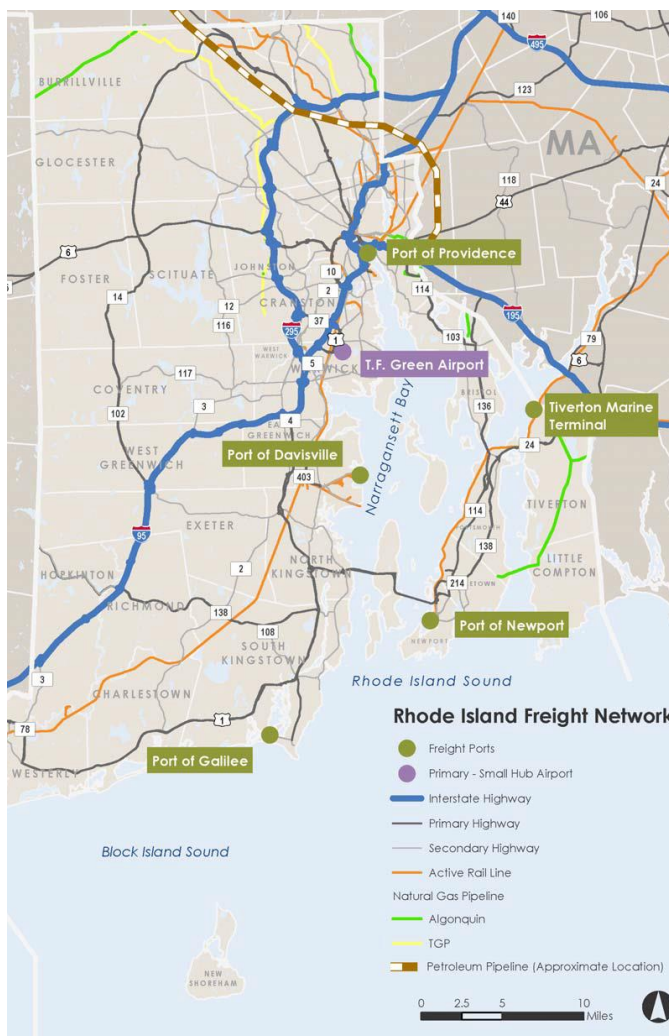
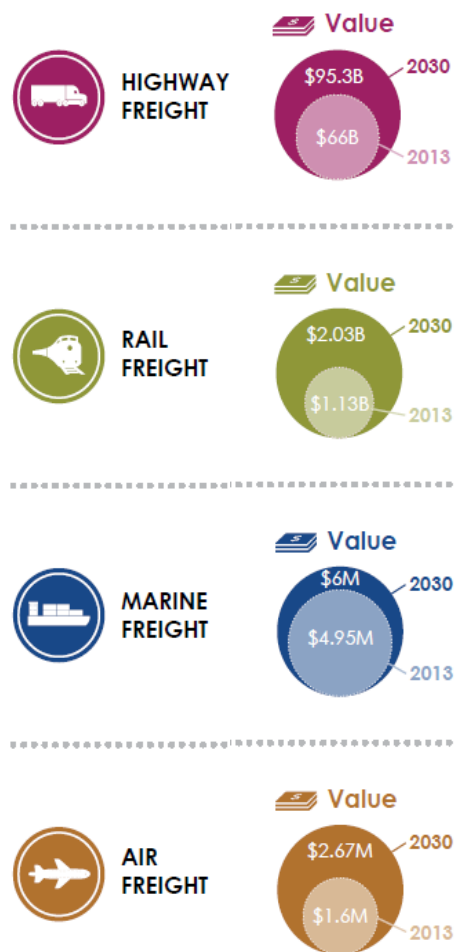


Figure 14 -- Freight Forecast by Type



Currently, the state and region are highly reliant on highways and truck transportation for commodity flow, with approximately **89 percent of all freight (by both weight and value) moving in and out of Rhode Island transported by truck**. This total truck tonnage is anticipated to grow at 2.1 percent per year through 2030, a trend of key consideration in the planning and prioritization of highway infrastructure projects over the next several decades. The Port of Providence, the second busiest (handling over 7.8 million tons of cargo in 2014) and one of only two deep-water ports in New England, also figures prominently in the future of freight movement in the region. With its strategic location along the Northeast Seaboard and excellent access to the regional highway network via I-95, the flow of goods and materials through this port is also expected to increase, as will the associated truck traffic connecting freight to regional and local destinations.

Routes 6, 10, and 146 are also essential links in the movement of freight and goods throughout the state and region. Included among the Freight Plan's findings is the recommendation that Routes 6 and 10 be designated as surface transport facilities on the [Rhode Island State Freight Map](#). Replacement of the 6/10 Interchange, which is also included in the Plan's recommended highway freight project needs, will be achieved under the separate Route 6/10 Interchange Reconstruction project.

Local Residential and Commercial Considerations

Locally, I-95 and other network freeways serve a densely populated region of the Urbanized Area (including the cities of Providence, Cranston, Pawtucket, Warwick, and East Providence) within which retailers, commercial vendors, and industrial concerns rely upon trucking for the movement of goods and materials. Other major users of the system include the United States Postal Service (the USPS Providence Central Mail Processing Facility is just 1 mile north of the I-95 Viaduct Interchange) and municipal waste haulers delivering recyclables and solid waste to the Rhode Island Resource Recovery Corporation (1 mile south of the U.S. 6 / I-295 Interchange).

III. Project Parties

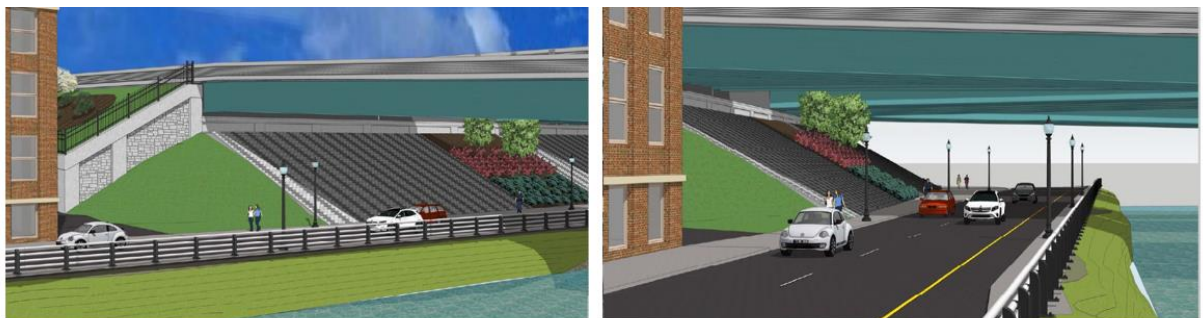
The [Rhode Island Department of Transportation \(RIDOT\)](#) is the applicant and primary party responsible for this project. RIDOT has extensive experience with federal grant processes and has successfully leveraged federal assistance across range of major transportation infrastructure projects, including recent **TIGER Grant** awards for the [I-95 Providence Viaduct \(Southbound\)](#), the [Apponaug Bypass \(Warwick, RI\)](#), and [Route 37 Safety Sweep \(Cranston, RI\)](#) projects, as well **BUILD** support for the [Simple, Smarter Roads for the Newport Innovation Corridor \(Newport,](#)

[RI](#) project. RIDOT will be responsible for administering the grant funds and managing the project, and contact information is provided on the cover page of this project narrative.

As discussed, RIDOT's program to replace the Providence Viaduct has been in development for some time, and the current plan to construct the replacement Viaduct Northbound facility (with integral improvements to address chronic congestion along this bottleneck segment of I-95 Northbound) enjoys broad support from state and local officials, transportation and business advocacy groups, and the general public. RIDOT has coordinated extensively with the [City of Providence](#) on its plans for the Providence Viaduct Northbound Project to ensure that its broad objectives (reducing congestion along the Interstate and other arterial freeways, improving the efficiency of regional highway and freight networks) are harmonized with local efforts aimed at improving quality of life within this highly urbanized area of the city.

RIDOT will continue to work closely with the City throughout the project, particularly to make improvements to the underside of the Viaduct to connect the East and West sides of Providence. The City will also be an important partner in ensuring that the Viaduct project promotes economic development in a growing commercial and residential neighborhood to the west of I-95. Local businesses and developers have long requested that RIDOT improve the safety and aesthetics beneath the Viaduct, which serves as the primary pedestrian route to Downtown, and this project will help to realize that vision.

Figure 15 -- Rendering of Potential Improvements to the Underside of the Viaduct



IV. Grant Funds, Sources, and Uses of All Project Funding

Project Budget

The Providence Viaduct Northbound Project has an estimated all-in cost of **\$250M**, including the completion of design, construction, soft costs, and contingencies.

Previously Incurred Expenses

RIDOT has committed internal resources to this project since 2016. Professional consultants have been engaged in designing and developing the project. To date, \$6 Million has been spent, with the majority (\$5.6 Million) spent on design.

Future Eligible Costs

The future eligible cost of the Providence Viaduct Northbound Project is estimated to be **\$250 Million**. The existing [Rhode Island State Transportation Improvement Plan \(STIP\)](#) currently includes **\$118 Million in future funds** to support the project over federal fiscal years (FFY) 2019-2027.

As described in more detail in the [Innovative Financing Section](#), 80 percent of this project will be financed by INFRA Grant funding (30%) and direct GARVEE bond proceeds (50%). The remaining 20 percent will be financed by state match funds. The costs of each construction phase are detailed in the [Project Scope, Schedule, and Statement of Work](#) section.

V. Merit Criteria

Objective #1: Support for National or Regional Economic Vitality

This project will generate considerable benefits, totaling a net present value (NPV) of **\$732.14M** over 30 years. **The benefit-cost ratio for this project is 4.44**, indicating that this project is an efficient and cost-effective investment that will support national and regional economic vitality.

Reductions in Traffic Fatalities and Serious Injuries

The project area currently averages 205 crashes per year, of which 46 typically involve serious or possible injuries. The figure below summarizes the three major safety issues in the project area. **This project will generate annual benefits of \$1.97M by reducing crashes by 43.54 percent.**

Figure 16 -- Breakdown of Eligible Future Costs

Design								
	INFRA		Other Federal		State Match		Total (\$M)	
Consultant	\$0.00	-	\$14.00	5.6%	\$3.50	1.4%	\$17.50	7.00%
RIDOT Staff	\$0.00	-	\$1.42	0.6%	\$0.35	0.1%	\$1.77	0.71%
ROW	\$0.00	-	\$1.08	0.4%	\$0.27	0.1%	\$1.35	0.54%
Utilities	\$0.00	-	\$0.16	0.1%	\$0.04	0.0%	\$0.20	0.08%
							\$20.82	8.33%
Construction								
	INFRA		Other Federal		State Match		Total (\$M)	
Contractor	\$75.00	30%	\$63.40	25.4%	\$34.60	13.8%	\$173.00	69.20%
Consultant	\$0.00	-	\$5.10	2.0%	\$1.28	0.5%	\$6.38	2.55%
RIDOT Staff	\$0.00	-	\$5.18	2.1%	\$1.29	0.5%	\$6.47	2.59%
Police Detail	\$0.00	-	\$2.48	1.0%	\$0.62	0.2%	\$3.10	1.24%
Utilities	\$0.00	-	\$1.71	0.7%	\$0.43	0.2%	\$2.14	0.86%
Contingency	\$0.00	-	\$22.24	8.9%	\$5.56	2.2%	\$27.80	11.12%
							\$218.89	87.56%
Other								
	INFRA		Other Federal		State Match		Total (\$M)	
Misc. RIDOT	\$0.00	-	\$1.12	0.4%	\$0.28	0.1%	\$1.40	0.56%
Misc. Other	\$0.00	-	\$7.11	2.8%	\$1.78	0.7%	\$8.89	3.56%
							\$10.29	4.12%
Total								
Total Future Eligible Costs (\$M)							\$250.00	100%

Figure 17 -- Projected Crash Reduction Benefits

Priority	Safety Issue	Crashes/Yr	Injuries/Yr	Crash Reduction	Annual Savings
1	Weaving, I-95N from 6/10 to Rt. 146	120.8	30.8	32.00%	\$ 966,908.80
2	Queuing along I-95N from 6/10 to 146	53	8.4	60.00%	\$ 514,598.52
3	Queuing along 6/10 Inbound to I-95N	31.8	7.2	60.00%	\$ 493,418.52
Totals		205.6	46.4	43.54%	\$ 1,974,925.84

Eliminate Bottlenecks in the Freight Supply Chain

The design improvements included in this project will reduce congestion on I-95, US-6, RI-10, RI-146, and I-195. Compared to the no-build alternative, the completion of this project will improve the average speed from 28 to 48 MPH, reducing annual vehicle hours travelled in the project area (VHT) by **51.9 percent**. The Viaduct bottleneck has been identified as the most critical freight problem in Rhode Island in the RI Freight Plan. In addition, the nearby interchange of I-95 and I-195 was recently identified as **the 35th-worst congestion point for freight traffic according to [the latest research](#) by the American Transportation Research institute.**

Restore Good Condition of Infrastructure

This project will replace crumbling structures with a new 100-year bridge, reconfigured ramps, and a C-D road connecting several of the most-travelled routes in Rhode Island. The reconstruction of the Viaduct will finally restore an asset long-identified as structurally deficient.

Advance Economic Development in Areas of Need

This project reinforces and improves critical link between Providence, Worcester, and Boston, the three largest cities in New England. The congestion reductions and safety improvements in this project will facilitate the flow of people and goods between these three metropolitan centers and improve access to myriad communities in between.

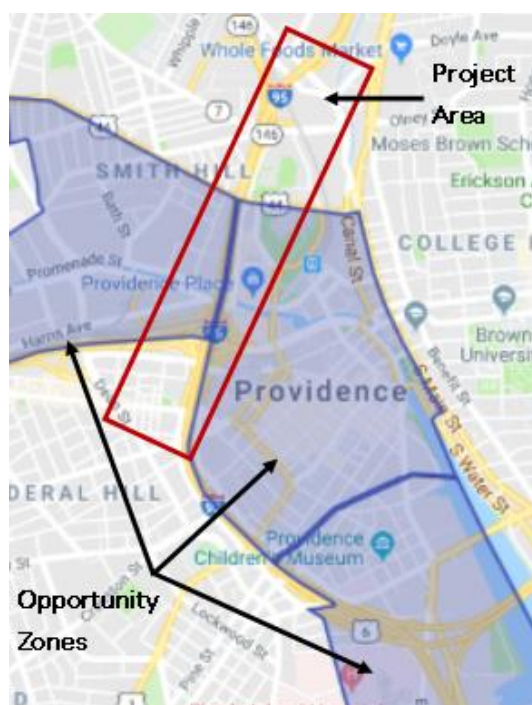
Rhode Island has 15 federally designed [Opportunity Zones](#), including Providence Census Tracts 1.01, 2, 6, 8, 19, and 25 in the immediate area of the Viaduct project. The Opportunity Zones program is designed to incentivize patient capital investments in low-income communities nationwide.

An investment in the Viaduct is an investment in the future growth of this region, which will be well-served by this project's improvements in traffic flows, safety, and linkages between local roads and the Interstate.

Reduce Barriers Separating Workers from Employment Centers

This project will reduce transportation barriers to all types of commuters who work in or pass through Providence, RI. Drivers who use I-95 will see their delays significantly reduced as will rail commuters who use I-95 to reach Providence Station. Pedestrians, cyclists, and local transit users will also benefit from the improvements to the underside of the Viaduct, which will include new lighting and improved connectivity to shared-use pathways.

Figure 18 -- Map of Opportunity Zones Surrounding the Project Area



Objective #2: Leveraging of Federal Funding

This project represents a critical, cost-effective investment that will maximize the use of public funds **for two reasons**.

First, the completion of the project described here will prevent the need for RIDOT to replace the Viaduct in-kind at a cost of **\$189.96M. Without INFRA support, RIDOT cannot guarantee that in-kind replacement can be avoided, if only to prevent the closure of I-95N.** However, because that effort would lock in the existing design flaws for decades, in-kind replacement would effectively be a waste of \$189.96M to preserve an unsafe, inefficient interchange.

Second, this project must be completed before RhodeWorks Truck-Only Toll Gantry 5 can be constructed over the Viaduct. The toll gantry will assess a fee of \$2.25 to an estimated 3,124 toll-eligible trucks per day. This toll location will generate an estimated \$2.046M per year.³ That revenue will be used to support the maintenance and operations costs of the Viaduct, and the remaining revenue will be made available to support the needs of Rhode Island's other transportation assets. **This project must precede the construction of Toll Gantry 5, however, because the gantry cannot be built on a structurally deficient bridge.** Therefore, the completion of this project will effectively enable the collection of approximately \$2.046M in state revenue per year.

Objective #3: Innovation

Area #1: Deployment of Innovative Technology

The Providence Viaduct Northbound Project will be built as a smart corridor that will embed in its infrastructure technologies making the highway ready for autonomous vehicles. Dedicated Short Range Communications (DSRC) system and CAV friendly striping and signage will be built in to seamlessly work with intelligent transportation systems.

The project could be a staging ground for a pilot that would use V2I communication to let motorists know that there is an active construction zone, using smart traffic apps for freight congestion mitigation. In addition, RIDOT could require the use of autonomous attenuator trucks within the project's work zone to improve on worker safety.

Area #2: Construction Phasing Innovation

While the Providence Viaduct Northbound Project is underway, it is vitally important to ensure that this freeway remains open for business. **The project will include the use of a temporary lane kept after the end of Viaduct South construction, and innovative phasing schemes to minimize lane and ramp closures during construction.** This phasing is discussed in detail in [Section VI](#). The construction phasing and traffic conditions will be monitored via RIDOT's Transportation Management Center (TMC), the state's hub of Intelligent Transportation Systems (ITS) and communication resources. Under the TMC Rhodeways program, road- side

³ These revenue projections are based on a Level 3 study available here. All projections are based on traffic volume data from 2016 collected as a toll system study of all 14 proposed truck-only tolling locations. The annual revenue projections account for multiple gantry adjustments and anticipated traffic diversions.

cameras help identify incidents on the highways and variable message signs provide real-time drive-time information to motorists. As part of the project, all construction phasing will be monitored at the TMC.

Area #3: Innovative Financing

The Viaduct is most important outstanding transportation project in Rhode Island, but due to budgetary constraints, there is a shortage of traditional funding available to support this project. To service the needs of the Viaduct's bridges, RIDOT will fund the project using a combination of direct GARVEE and INFRA funds, along with the required 20 percent state match. In addition to the requested \$75M INFRA Grant (30%), \$125M in direct GARVEE bond proceeds (50%) will be deployed, pursuant to 23 U.S.C. 122, and the remaining \$50M (20%) of the project cost will be supported by state funds. RIDOT's use of direct GARVEE bonds in this case will allow the Department to accelerate the construction timeline for the Viaduct, consistent with GARVEE guidance available from [FHWA's Center for Innovative Finance Support](#).

Objective #4: Performance and Accountability

RIDOT issues a [quarterly report](#) to fulfill statutory requirements and to build the public's trust in the Department by ensuring that RIDOT is accountable to the taxpayers of the State of Rhode Island. Going beyond the statutory requirement of the RhodeWorks legislation, the report also includes updates on key accomplishments during the past quarter.

Accountability is led by RIDOT's Division of Project Management. Charged with oversight and management of all projects from initial design through final completion, project managers at RIDOT closely monitor schedules, coordinate permits and regulatory requirements, and ensure that projects are completed on time, on budget and at the highest quality.

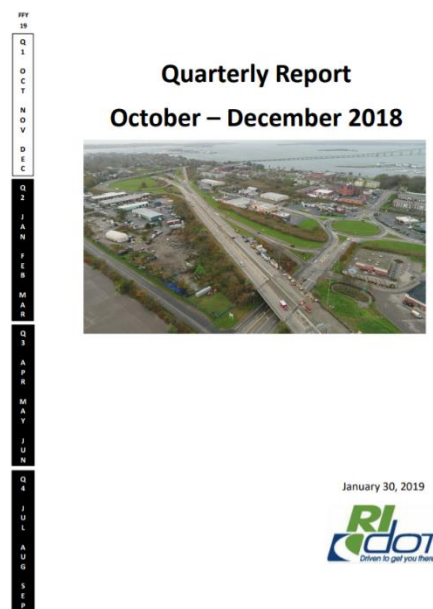
RIDOT's INFRA-funded project will be delivered on agreed-upon schedules, that will generate clear, quantifiable, results, and that will advance both USDOT and RhodeWorks goals. Once the project has advertised, its progress will be tracked in the Quarterly Report.

As a design-build project, RIDOT will include bonuses for early completion of milestones during different phases in the contract, following a similar incentive/disincentives method used in previous rapid-bridge replacement projects in Rhode Island.

Lifecycle Costs and Funding Sources for Operations and Maintenance

As previously stated, the completion of this project will enable the construction of RhodeWorks Truck-Only Toll Gantry Location 5, which will provide over \$2M annually in revenue. RhodeWorks requires that the revenue collected at each gantry is utilized to service the needs

Figure 19 – The Cover of RIDOT's Most Recent Quarterly Report



of the bridge(s) associated with that location, so the \$2M collected along the Viaduct **must be dedicated to the maintenance of the Viaduct.**

RIDOT estimates that the maintenance costs of the bridge over 30 years will total \$10.01M, including deck repairs and soft costs. RhodeWorks asserts that toll revenues cannot be diverted away from the maintenance and operation of the Viaduct until the needs of its bridges are met. Because the preservation of the Viaduct will require steady maintenance, this effectively means that toll revenues will always be available to ensure that the Viaduct remains in a state of good repair. This guarantee will help to prevent the kind of deterioration that led to the structural deficiency of the Viaduct, along with hundreds of other bridges in Rhode Island.

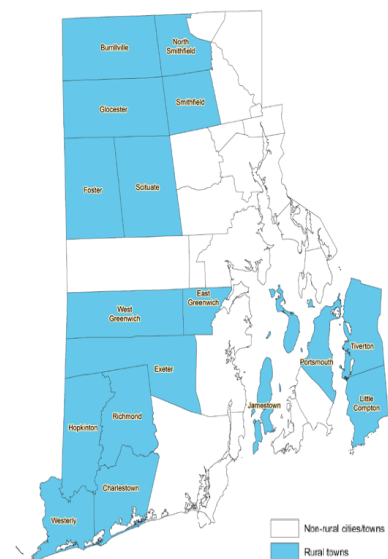
Figure 20 -- Projected Maintenance Costs Over 30 Years, Build Scenario

Task Description	Unit Cost (\$M)	Count in 30 Years	Cost in 30 Years (\$M)
Bridge Inspection	\$0.02	15	\$0.30
High Pressure Water Cleaning on Bridge	\$0.12	15	\$1.80
Concrete Surface Treatment (Protective Coat)	\$0.20	3	\$0.60
Joint Replacement	\$0.50	2	\$1.00
Deck Repairs	\$2.00	1	\$2.00
Repainting Existing Structural Steel	\$2.00	1	\$2.00
Subtotal Rehabilitation Cost			\$7.70
Engineering, Contingency, & Mobilization (30%)			\$2.31
30-Year Maintenance Cost WITH INFRA GRANT			\$10.01

Key Accountability Metrics

This project will include the establishment of an accountability measure which will be used to report on the project's success. **The Department is prepared to be held accountable if the achieved Travel Time Delay improvement for all vehicle types within the project limits does not result in at least 75 percent of the projected improvement as compared to projected No-Build Travel Time Delay performance** within one year of the project's substantial completion date. Travel Time Delay is a key component used to calculate Travel Time Savings presented in this project's Benefit Cost Analysis. **The Travel Time Delay performance assessment will reflect traffic during the 6:00 am to 10:00 am and 4:00 pm to 8:00 pm weekday travel time periods within the project limits.**

Figure 21 – Map of Rural and Non-Rural Areas in Rhode Island
(Source: [RIDOH](#))



Additional Considerations

Geographic Diversity

Rhode Island is one of the most geographically diverse states in the country. A 20-mile radius around the Viaduct includes cities, suburbs, rural areas, waterfront communities, T.F. Green Airport and several Massachusetts communities. As the capital city of Rhode Island, Providence is a hub for everyone in the state, whether they live in nearby rural communities and just "come to the city" to do business, or they are suburban commuters or urban residents. I-95 is a crossroads for everyone in the Northeast Corridor, and even those who choose not to drive on

that highway are impacted by the safety and congestion delays through this unavoidable corridor. Completing this project serves a very geographically diverse area.

Project Readiness

As the following section details, RIDOT is working to ensure that this project can be completed as efficiently and effectively as possible following the award of INFRA funding.

VI. Project Readiness

Summary

RIDOT has spent much of the past decade evaluating alternatives for replacement of the I-95 Providence Viaduct which also eliminate the inherent deficiencies of the interchanges with the 6/10 Connector and Route 146 along I-95 Northbound. In the Providence Viaduct North Project, RIDOT has identified a comprehensive solution that is technically and economically feasible.

The Department is currently working to secure environmental approvals which will allow the project to move forward, and the 10 percent designs presented here provide a comprehensive overview of a phased-approach to the construction of a complex and critical highway asset.

Technical Feasibility

Engineering Design Studies and Activities

RIDOT has commissioned a design contract to advance the project through preliminary engineering, an endeavor that was completed in 2018. This effort will advance all elements of the project design (including but not limited to, highway, structural, traffic, drainage, utilities) to a level sufficient for RIDOT to advertise the project as a design-build contract, including plans, specifications, and estimates to a level tantamount to a 10 percent design review submission under a conventional design-build procurement approach. This consultant will also be supporting RIDOT in the preparation and submission of permit applications, modifications, and extensions to the authorities having jurisdiction over the work.

Development of Design Criteria and Basis of Design

As outlined throughout this application, the flaws in the design of the existing Viaduct have led RIDOT to prioritize the development of a design which rectifies the existing congestion and safety problems in the project area. The basis of the design referenced and presented in this narrative is therefore clear: **the preeminent concern in designing this project is correcting the problems with the design of the existing Viaduct.**

Basis for the Cost Estimate

As shown in [Section IV](#), RIDOT has estimated that the total future cost of the project will be \$250M. This includes the completion of design, construction, and a \$27.8M contingency fund. The base construction cost for the work detailed below will be approximately **\$173M**.

Figure 22 -- Anticipated Construction Schedule and Cost

<u>Project Construction Stage</u>	<u>Anticipated Completion Date</u>	<u>Estimated Construction Cost</u>
Notice to Proceed	April 2020	-
Construction Begins	September 2020	-
Phase 1	May 2021	\$8.47
Phase 2	August 2022	\$53.23
Phase 3	May 2023	\$33.87
Phase 4	August 2024	\$41.13
Phase 5	November 2025	\$36.29
Total Construction Cost		\$173.00

Project Scope, Schedule and Statement of Work

From the 10 percent design documents, RIDOT and its consultants have developed the following project schedule, which includes **five phases**. All scheduling information is based on a **presumed notice-to-proceed (NTP) date of April 30, 2020**.

Phase 1: Shifting Northbound Traffic (Spring 2020-Spring 2021)

The first phase of construction on this project will involve rehabilitating the structure that formerly carried I-95 Southbound. Located between the Northbound structure slated for replacement and the recently completed New Southbound Viaduct, the old Southbound structure will be brought back into service temporarily to support Northbound traffic. **This shift will free up a large portion of the old Northbound Viaduct, allowing construction and demolition work to proceed without impeding traffic flows.**

The old Southbound structure will link to the old Northbound structure just north of the 6/10-Downtown Providence on-ramp, forming a new five-lane structure (**"The Temporary Northbound Viaduct"**). The three left-most lanes will service I-95 Northbound, while the two right-most lanes will service the 6/10-Downtown on-ramp and the RI-146 / State Offices Off-Ramp (Exit 23). Phase 1 will also include the construction of a temporary on-ramp linking Atwells Avenue to the Temporary Northbound Viaduct.

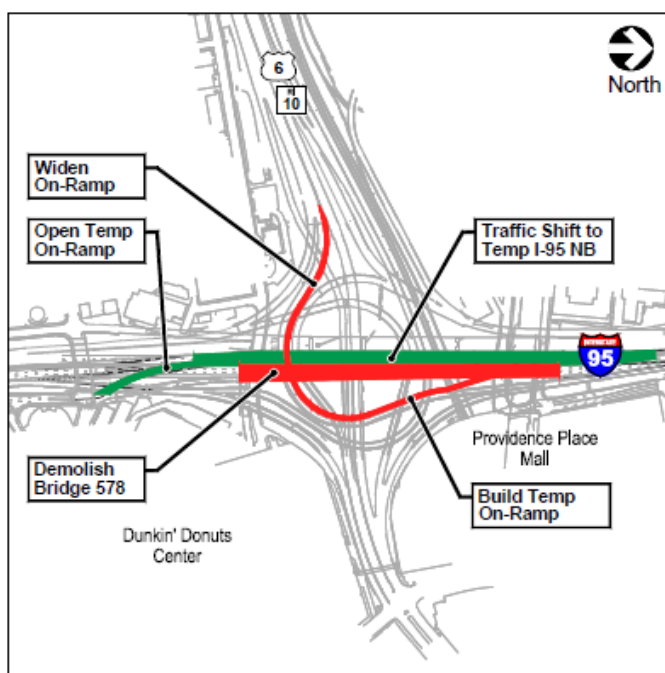
Phase 2: Demolishing Old Bridges, Building New Ramps (Spring 2021-Summer 2022)

With the Temporary Northbound Viaduct established, construction will turn to the construction of new ramps. First, the existing ramp linking US-6 East to I-95N will be widened from one lane to two. Next, the old Northbound Viaduct (Bridge No. 578-North) will be demolished.

Figure 23 -- Phase 1 Construction



Figure 24 -- Phase 2 Construction



That demolition will allow for the construction of a new, temporary ramp connecting US-6 East to the Temporary Northbound Viaduct. Traffic will then shift from the old ramp to the new one, and the old ramp will be demolished. This phase will also include the opening of the temporary on-ramp connecting Atwells Ave to the Temporary Viaduct, constructed in Phase 1.

Phase 3: Detour, Close Ramp, Construct a New C-D Road (Summer 2022-Spring 2023)

Phase 3 is the only stage of the project that will interfere with traffic flows. In this phase, the ramp connecting Downtown to I-95N will be closed and demolished. This phase will also include continued demolition of the old Bridge 578 structure.

In later phases, that ramp will be rebuilt on a new alignment over Amtrak and the Woonasquatucket River. The new ramp will split, eventually offering drivers coming from Downtown the choice of merging directly onto I-95N or merging onto a C-D road connecting directly to RI-146 and the State Offices Ramp (Exit 23).

For the time being, traffic that typically uses this on-ramp will be re-routed to nearby on-ramps along Atwells Ave (West) and Charles St (Northeast).

Phase 4: Reconstruct the Exit 23 Off-Ramp (Spring 2023-Summer 2024)

Phase 4 will include the construction of the C-D road bridge—which will connect I-95N, RI-146N, US-6E and Providence city streets—adjacent to the Temporary Viaduct. This phase also includes the construction of a new permanent on-ramp connecting Atwells Ave to the C-D road bridge, as well as the construction of new on-ramps linking Downtown to the New Viaduct and the C-D Road, and linking US-6E to both the Viaduct and the C-D Road. When this phase is complete, all of the permanent individual elements of the new Viaduct structure will be in place, but not yet open to traffic.

Figure 25 -- Phase 3 Construction

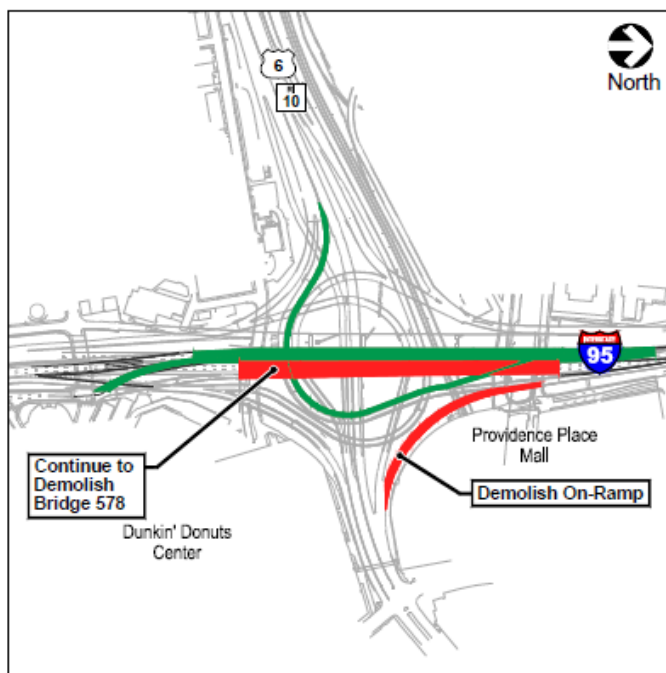
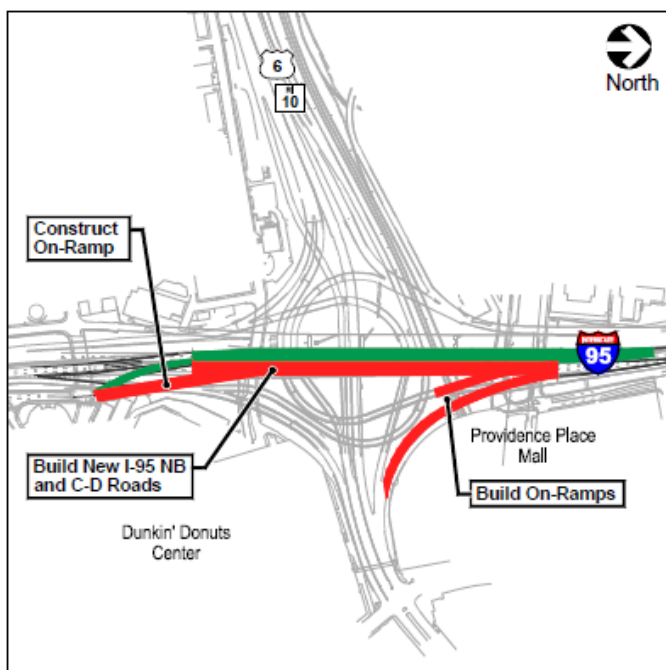


Figure 26 -- Phase 4 Construction

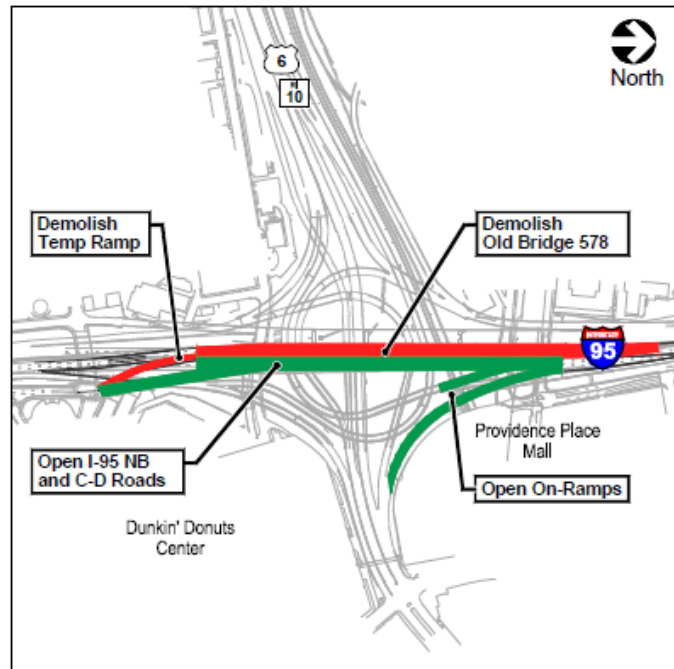


Phase 5: Finish Demo and Shift Traffic onto New Viaduct (Summer 2024-Fall 2025)

Phase 5 is the final stage of the project. With all new ramps and bridges in place, interstate traffic will shift from the Temporary Northbound Viaduct onto the C-D road bridge, which will allow RIDOT to demolish the old Southbound structure and open access to the New Northbound Viaduct.

During this phase, RIDOT will also shift traffic off of the temporary ramp linking Atwells Ave to the Old Viaduct. The temporary ramp will be demolished, and with traffic shifted into its final configuration, the project will be complete. **RIDOT estimates that the project will achieve substantial completion by the end of FFY 2025.**

Figure 27 -- Phase 5 Construction



Distinctions Between This Project and RIDOT's Previous INFRA Request

The Providence Northbound Viaduct Project proposed here differs from RIDOT's prior INFRA proposal in two key ways.

First, following an internal evaluation of the Viaduct's needs, RIDOT has elected **not to pursue a P-3 financing model for the project and instead employ a design-build approach**. This strategy will reduce total project costs from **\$340M to \$250M** while allowing RIDOT to retain the benefit of working closely with outside partners to reconstruct the Viaduct as quickly and cost-effectively as possible.

Second, the project proposed here has narrower limits than the previous application. While the Viaduct project was originally set to include [1] the replacement of the Dean St. ramp onto US Route 6 Westbound and [2] the replacement of the Smith St Bridge over I-95, those two elements are now being addressed as independent projects. **Because those two project components made up the southern and northern limits, respectively, of the Viaduct project area, the core benefits of the project remain intact** while those two items are addressed on their own. RIDOT will be carefully managing the construction of all projects in the area to avoid interference and minimize traffic impacts.

Project Milestones

To date, RIDOT has developed sufficiently detailed conceptual designs to ensure that the project is **(a)** constructible within the constraints of state and federal funds available, **(b)** in conformity with modern highway design safety standards and performance criteria, and **(c)** consistent with local, regional, and national objectives for transportation efficiency and resiliency in the 21st Century. Crucially, all elements of the project are contained in the existing operational right-of-

way, obviating potential risks associated with property acquisitions. As the following section(s) detail, all necessary approvals have either been secured, or are in development already.

Figure 28 -- Project Milestones by Quarter

Project Milestone	FFY 2019	FFY 2020	FFY 2021	FFY 2022	FFY 2023	FFY 2024	FFY 2025
Preconstruction Engineering	◆◆◆◆	◆◆					
Contract Advertisement		◆					
Notice to Proceed		◆					
Construction			◆◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	◆◆
Project Completion & Closeout							◆
◆ = Federal Fiscal Year (FFY) Quarter							

Required Approvals--Environmental

Section 106 and Section 4(f)

By memo dated May 2, 2018, the Federal Highway Administration offered two options to the Rhode Island Department of Transportation to conclude the Section 106 process for this project. The Rhode Island Department of Transportation agreed to Option 1 which had a set number of specifically prescribed items that will lead to an expedited completion of the Section 106 process. The Rhode Island Department of Transportation has completed the document in strict conformance with the prescribed requirements. The document has been circulated for review and comment, the comment period has expired, and the comments have been incorporated into a revised document that is in the process of being circulated for signature. RIDOT anticipates, with assurances from the Rhode Island Federal Highway Division Administrator, that the Section 106 process will be concluded expeditiously (estimated to be on or before March 29, 2019).

Upon ratification of the programmatic agreement, a Programmatic Section 4(f) evaluation—required by the adverse impact to the Providence Covelands—will be completed and submitted to FHWA for approval. The Section 106 process will be resolved before the Environmental Assessment (EA) is submitted to FHWA for evaluation.

NEPA

In cooperation with the FHWA Rhode Island Division, RIDOT is preparing an Environmental Assessment (EA) for the construction of the Providence Viaduct Northbound. This EA will assess the impacts that the construction of the new Viaduct and Collector-Distributor Road will have on the area surrounding the project. The EA will include an evaluation of the potential impacts to the natural environment, the local economy, and cultural resources.

Other Environmental Permits

RIDOT will also secure the following permits as the project is approaching 90 percent design:

- Rhode Island Department of Environmental Management (RIDEM) Application for Stormwater Construction Permit and Water Quality Certification
- Rhode Island Coastal Resources Management Council (CRMC) Type B Assent for work within 50' of a freshwater wetland, riverbank, and floodplain.
- United States Army Corps of Engineers (USACE) General Permit

- Compliance with RIDOT/USDOJ/USEPA Stormwater Consent Decree

Required Approvals—State/Local

Planning Approvals

Aside from the other environmental permits detailed above, there are no additional planning approvals required for this project.

Right-of-Way

All right-of-way required to complete this project is either [1] owned by the State already, or [2] in use for transportation purposes.

Broad Public Support

This project enjoys broad public support. RIDOT has received written letters of support from all critical stakeholders, including Rhode Island Speaker of the House, Nicholas Mattiello, Rhode Island Senate President Dominic Ruggerio, the American Council of Engineering Companies (ACEC-RI), the Providence Foundation, Quonset Development Corporation, General Teamsters Local 251, I-95 Corridor Coalition, Rhode Island Public Transit Authority, The Providence Place Mall, The Foundry Associates, and the Providence-Warwick Convention and Visitor Bureau.

Required Approvals—Federal Transportation

This project is included in the Statewide Transportation Improvement Program for FFY2018-2027 with mixed funding sources. The project will secure all necessary federal approvals—including a FONSI referenced above—before construction begins.

Assessment of Project Risks and Mitigation Strategies

As noted in preceding sections of this document, the Providence Viaduct Northbound Project is being developed such that all facilities can be constructed within the existing freeway rights-of-way. This element removes any cost or schedule risks associated with the right-of-way acquisition and certification process, components which typically involve a degree of risk to cost and schedule in major construction projects.

The risks associated with this project are limited to the typical schedule uncertainties associated with projects of this magnitude, along with the potential for delays associated with obtaining the necessary regulatory approvals prior to construction. Informed by the completed I-95 Providence Viaduct Southbound project, RIDOT is keenly aware of these risks, and will work to mitigate them by:

1. Leveraging key lessons learned on a project that is nearly identical in several respects, including bridge construction over the Woonasquatucket River and NEC, maintaining traffic flows and protecting drivers on a critical segment of the interstate; and
2. Taking every advance measure possible to minimize and mitigate all project risks.

The preparation of bidding documents for a design-build contract is seen as a low-risk endeavor, with the schedule totally under the control of RIDOT and its consultant.

VII. Large/Small Project Requirements

With an estimated future cost of \$250 Million, this project exceeds the minimum threshold for a large project, as specified by Section C of the 2019 INFRA Notice of Funding Opportunity.

National and Regional Economic, Mobility, and Safety Benefits

This project generates significant economic, mobility, and safety benefits. As the attached Benefit Cost Analysis explains in much more detail, this project will generate safety benefits, reduce emissions, improve traffic flows, create jobs, and reduce maintenance costs. In addition, the system reliability improvements detailed below will considerably improve freight efficiency.

Cost Effectiveness

This project is very cost effective, **with a B-C ratio of 4.44**. Using a standard 7 percent discount rate, this project generates more than **\$944M in present value benefits**, many of which (including travel time savings) actually increase over time.

Contributions to the Goals of 23 U.S.C. 150

This project supports all seven national goals listed under 23 U.S.C. 150.

Safety

This project will reduce traffic fatalities and serious injuries **by more than 40 percent**.

Infrastructure Condition

This project will considerably improve the condition of RI's highway system, restoring a critical segment of I-95 to a state of good repair.

Congestion Reduction

This project will reduce congestion on I-95N through Providence, increasing average daily speeds from 28 MPH to 48 MPH.

System Reliability

The planned infrastructure improvements of the I-95 Viaduct project will help RIDOT achieve future system performance targets for the National Highway Freight Program and the National Highway Performance Program. The national Interstate Level of Travel Time Reliability (LOTTR) measure is expected to improve as compared to current levels. The LOTTR for this portion of Interstate I-95 northbound that is consistently reliable averaged only **24.8 percent** during 2018.

This unacceptable level of reliability occurred in every month during 2018. The statewide LOTTR measure for interstate travel time reliability was 78.6 percent during the same time period.

Figure 29 -- LOTTR Statistics

2018 Level of Travel Time Reliability		2018 Freight Reliability Index*	
I-95 Viaduct NB Segment	RI Statewide Interstate System	I-95 Viaduct NB Segment	RI Statewide Interstate System
24.80%	78.60%	2.13	1.79
* <1.50 is considered to be reliable for truck travel time.			

Freight Movement and Economic Vitality

The national Freight Reliability measure is also expected to show improvement as a result of the planned improvements. The 2018 annual percentage of 'reliable' freight travel time for this segment of I-95 northbound was **2.13** which exceeded the 2018 statewide measure which was 1.79 and is considerably above the national performance standard of 1.50 or less.

Environmental Sustainability

The traffic flow improvements generated by this project will lead to significant emissions reductions, improving air quality throughout the Providence region.

Reduced Project Delivery Delays

The award of the requested INFRA Grant support for this project will enable this project's acceleration and completion by 2025.

Preliminary Engineering

RIDOT has been working with a consult to develop a preliminary design for this project since 2016. In addition, RIDOT is working closely with FHWA-RI to perform studies supporting the requirements of the National Environmental Policy Act (NEPA).

Non-Federal Financial Commitments

This project is supported by \$50M in non-federal (state) funding. In addition, as referenced in [Section V](#), the completion of this project will enable the construction of RhodeWorks Toll Gantry 5 at a later date, which will generate more than \$2M in annual state revenue for RIDOT. This revenue will directly support the regular maintenance of the newly constructed Viaduct.

Contingency Amounts

As shown in [Section IV](#), the budgetary calculations for this project include an explicitly stated contingency fund totaling **\$27.80M**, also reflected in the SF-424C for this application.

Completion Without Federal Funding

Without INFRA support, RIDOT cannot guarantee that the project can be completed as described here. Because the Viaduct is such a critical piece of infrastructure that cannot be allowed to fail completely, RIDOT will eventually be forced to repair the Viaduct at the lowest possible cost, effectively replacing it in-kind. The new asset would therefore retain the same safety issues and design flaws as the existing one, at an estimated cost of \$189M. That project would simply be a waste of money. **The only way to guarantee that the problems with this critical asset are fixed is to secure the requested INFRA support.**

Expected Construction Date

With INFRA support, RIDOT fully expects to begin construction within 18 months of funding obligation. As the project schedule in [Section VI](#) indicates, RIDOT expects to begin construction in September 2020, and complete the project by November 2025.

- END -